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FINAL REPORT

Cyclones and Cyclogenesis over North Pacific North Atlantic, Arctic Ocean, and their Upwind Continents

ABSTRACT

For determining seasonal and annual variations of cyclone activities in the northern hemisphere, over 500 cyclones in NMC and Japanese surface maps were examined and their 6-hourly parameters were determined for generating the Northern Hemisphere Cyclone Tape. The cyclone tape, covering a five year period, June 1981 - May 1986 was generated under this contract. Produced from this tape are five Volumes of annual reports showing monthly, seasonal, and annual distributions of cyclone parameters depicted by red-colored cyclone parameters superimposed upon green-colored base maps.

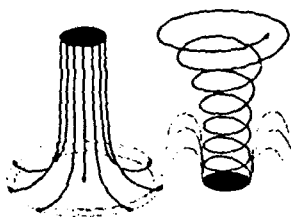
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N00014-84-C-0513

July 8, 1990

T. Theodore Fujita

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FINAL REPORT

Cyclones and Cyclogenesis over North Pacific

North Atlantic, Arctic Ocean, and their Upwind Continents.

CONTRACT NUMBER N00014-84-C-0513

STATEMENT "A" per Kathleen Villard
ONR/Code 1122M1, 800 N. Quincy St.
Arlington, VA 22217-5000
TELECON 8/10/90

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July 8, 1990

BY

T. Theodore Fujita

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RESEARCH PERFORMED

In an attempt to determine cyclone activities over North Pacific, North Atlantic, Arctic Ocean, and their upwind continents, all cyclones detected in the 6-hourly NMC surface maps and 12-hourly Japanese maps were analyzed and examined for continuity and accuracy. The period of analysis is five (5) years, June 1981 through May 1986. A total of 7304 NMC maps and 3652 Japanese Maps were examined and re-analyzed.

The cyclone computer tape designed and updated by Fujita now includes "5" years of data. The tape will be updated further under the next grant. The copy of the tape will be available to NAVY and other authorized users at various updating stages. The tape contains year, month, day, 6-hourly time, latitude and longitude, direction and speed of translational motion, central pressure, deepening and filling, estimated cyclone windspeed, rate of change in windspeed (intensification and weakening). The cumulative numbers of these cyclones for entry in the cyclone tape are listed hereunder.

| | 1981-1982 | 1982-1983 | 1983-1984 | 1984-1985 | 1985-1986 |
|-----|-----------|-----------|-----------|-----------|-------------|
| JUN | 1- 75 | 1008-1089 | 2116-2202 | 3225-3315 | 4283-4357 |
| JUL | 76- 163 | 1091-1185 | 2203-2287 | 3316-3382 | 4359-4439 |
| AUG | 164- 223 | 1187-1265 | 2288-2357 | 3383-3453 | 4441-4514 |
| SEP | 224- 304 | 1266-1348 | 2360-2442 | 3454-3522 | 4515-4581 |
| OCT | 305- 388 | 1350-1446 | 2446-2525 | 3524-3610 | 4582-4670 |
| NOV | 390- 488 | 1448-1560 | 2526-2628 | 3611-3697 | 4671-4765 |
| DEC | 489- 593 | 1562-1651 | 2629-2742 | 3699-3799 | 4766-4868 |
| JAN | 594- 682 | 1652-1744 | 2743-2845 | 3800-3894 | 4869 - 4949 |
| FEB | 683- 767 | 1746-1836 | 2846-2933 | 3895-3988 | 4950 - 5001 |
| MAR | 768- 851 | 1838-1924 | 2934-3037 | 3989-4095 | 5002 - 5085 |
| APR | 852- 940 | 1925-2018 | 3038-3136 | 4096-4191 | 5086 - 5180 |
| MAY | 941-1006 | 2019-2115 | 3137-3224 | 4192-4281 | 5181 - 5277 |

The cyclone parameters included in this cyclone tape were mapped experimentally into Northern-hemisphere statistical maps. It has been found that different types of maps can be produced for specific objectives which will increase as years go by and more cyclone data are included in future years through systematic updating. Results of the experimental mapping were forwarded as "ANNUAL REPORTS" to

Scientific Officer N00014

and

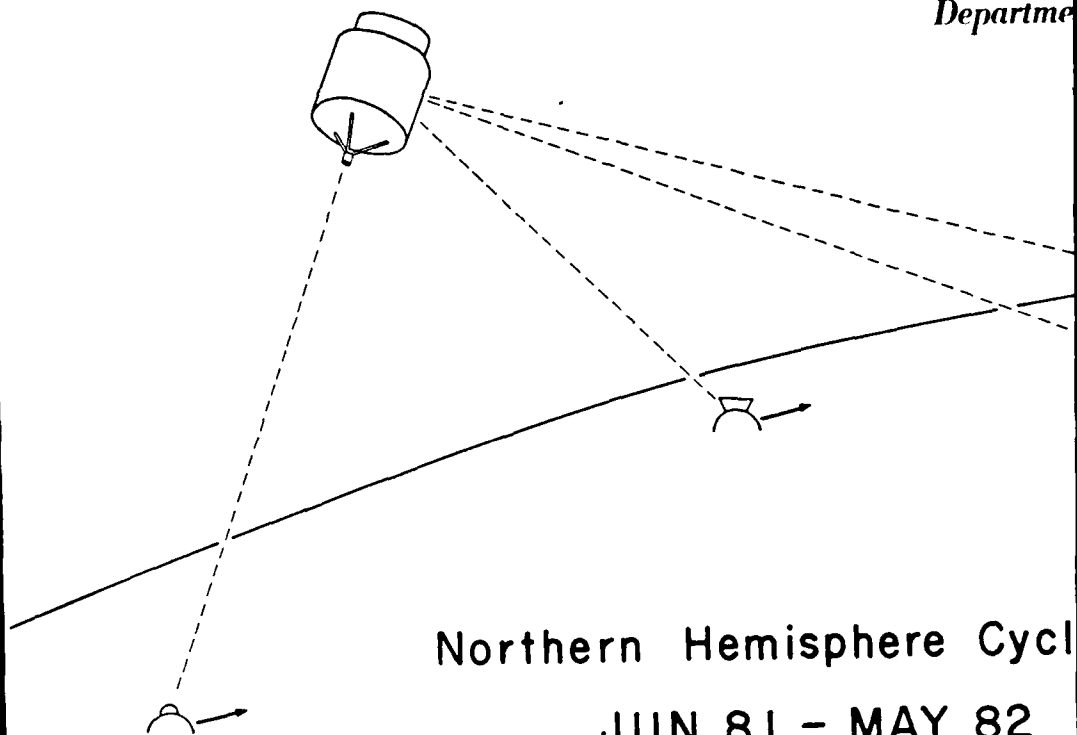
Administrative Contracting Officer N 62880

at the end of each year on July 8. A list of these annual report is:

| Annual Reports | Periods | Remarks |
|----------------|----------------------|---------------------|
| Volume 1 | June 1981 - May 1982 | Cover page attached |
| Volume 2 | June 1982 - May 1983 | Cover page attached |
| Volume 3 | June 1983 - May 1984 | Cover page attached |
| Volume 4 | June 1984 - May 1985 | Cover page attached |
| Volume 5 | June 1985 - May 1986 | Cover page attached |

It has been found that the results of these test analyses presented in these annual reports are very useful in obtaining climatological cyclone situations for the Navy operations. It is feasible to determine the regions of climatological storm hazards anywhere in the Northern Hemisphere. An effort of updating the cyclone tape in future years under the new grant will enhance the accuracy of prediction. The cyclone tape, including the future updating, can be duplicated by the Navy and its format may be changed for individual computers.

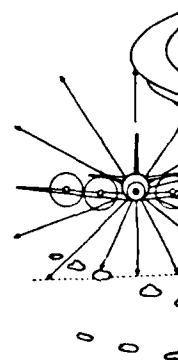
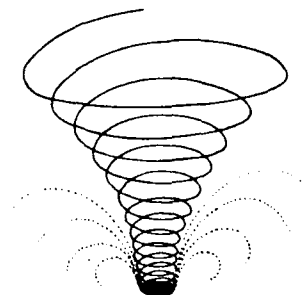
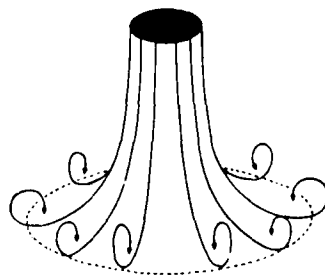
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Northern Hemisphere Cycl
JUN 81 - MAY 82

by
T. Theodore Fujita

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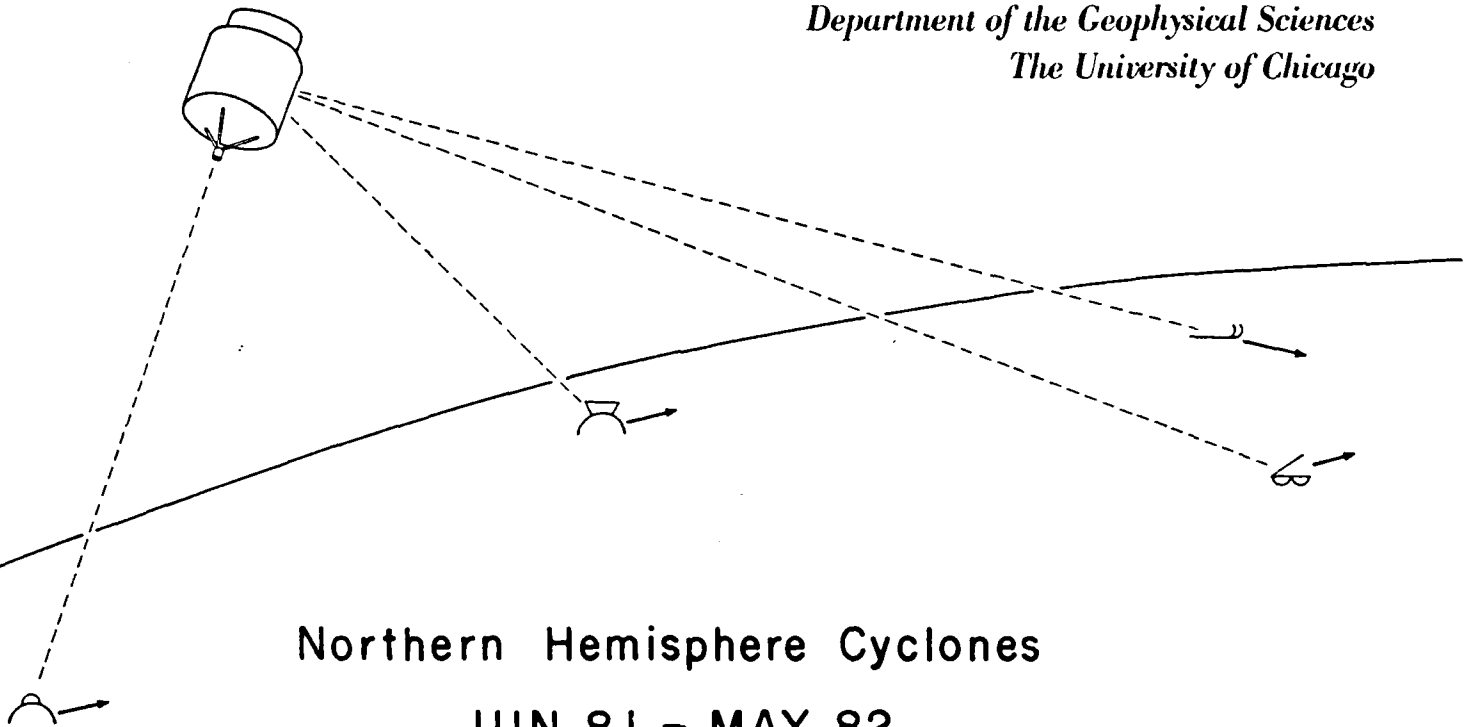


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|------------|-------------------------------------|------------------------|
| 223 | NORTHERN HEMISPHERE CYCLONES | JUN 81 - MAY 82 |
| 224 | NORTHERN HEMISPHERE CYCLONES | JUN 82 - MAY 83 |
| 225 | NORTHERN HEMISPHERE CYCLONES | JUN 83 - MAY 84 |
| 228 | NORTHERN HEMISPHERE CYCLONES | JUN 84 - MAY 85 |
| 229 | NORTHERN HEMISPHERE CYCLONES | JUN 85 - MAY 86 |

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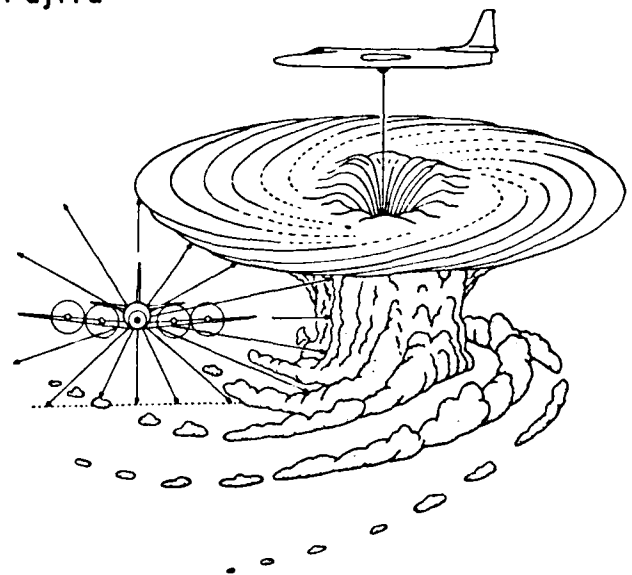
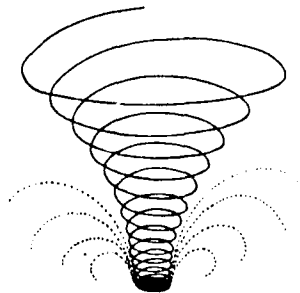
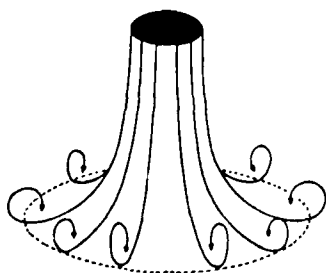
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The University of Chicago*



Northern Hemisphere Cyclones JUN 81 - MAY 82

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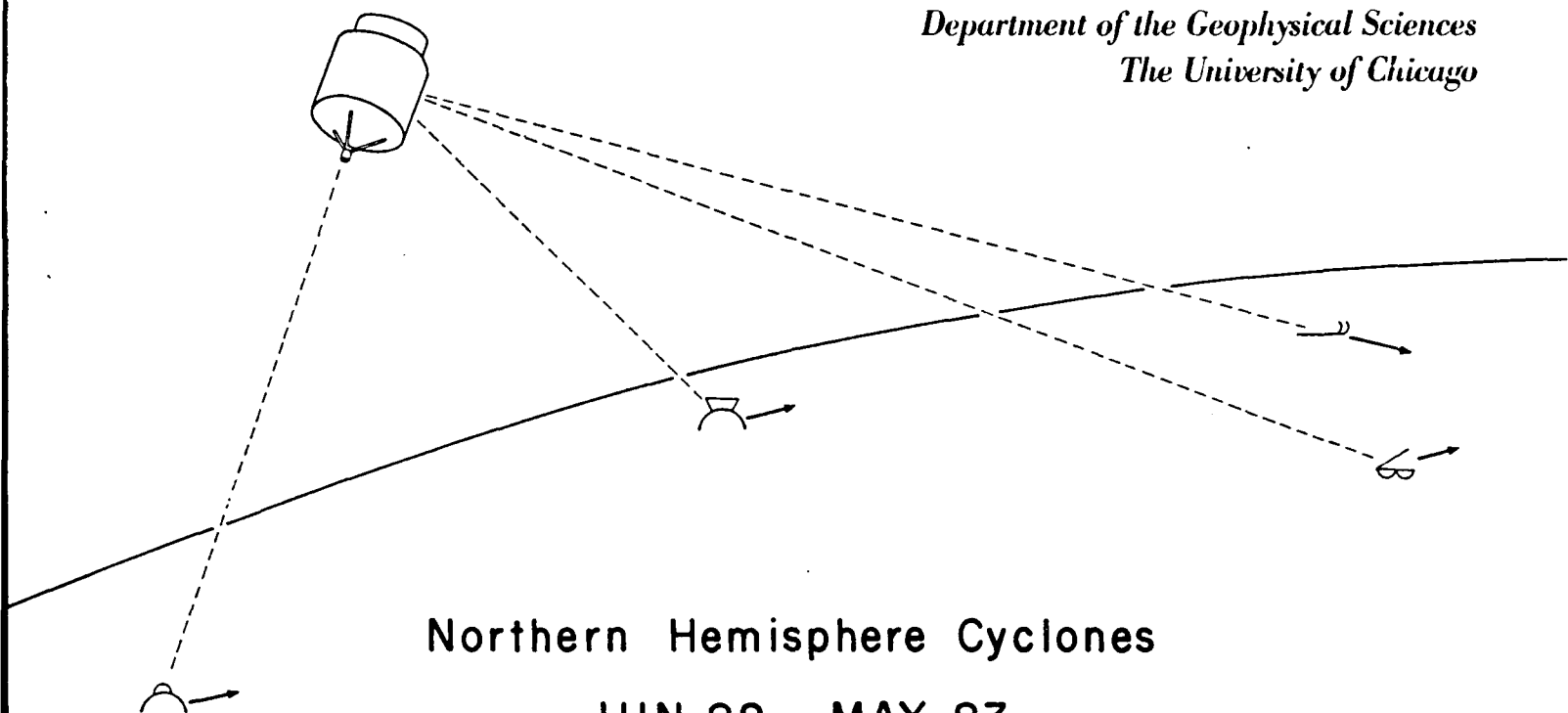


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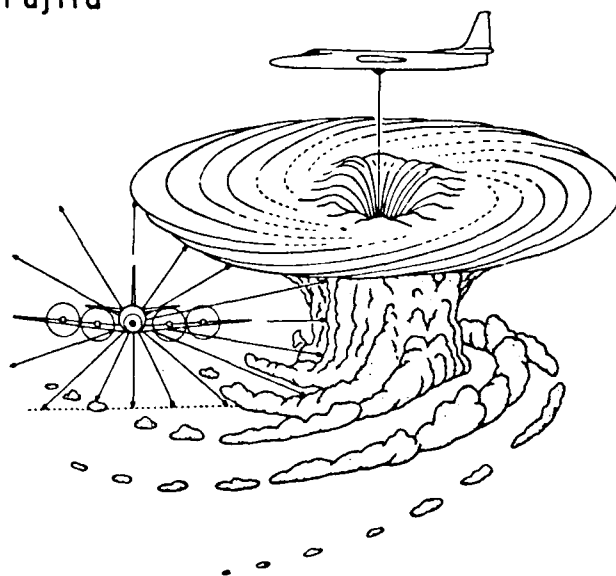
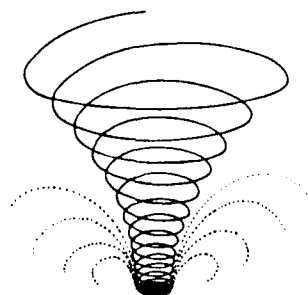
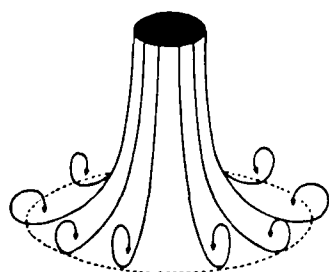


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JUN 82 - MAY 83

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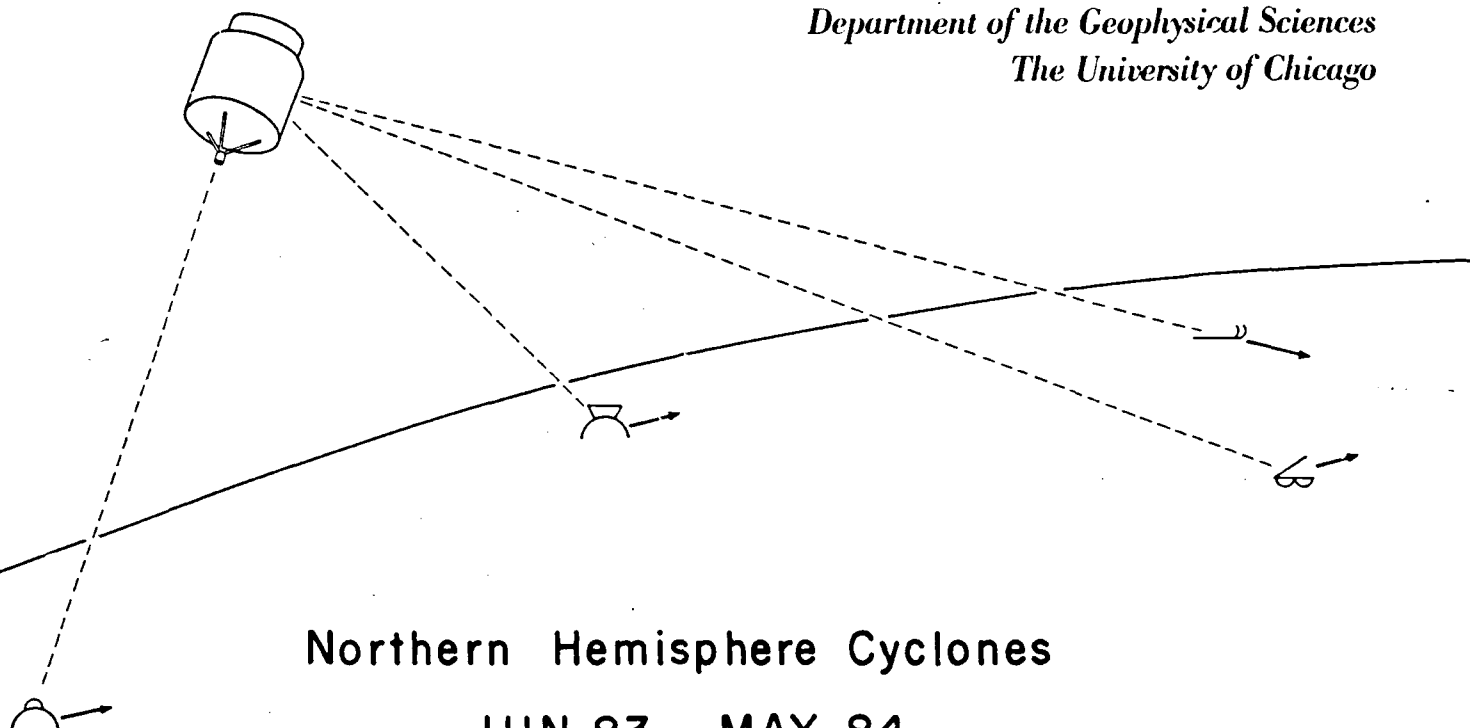


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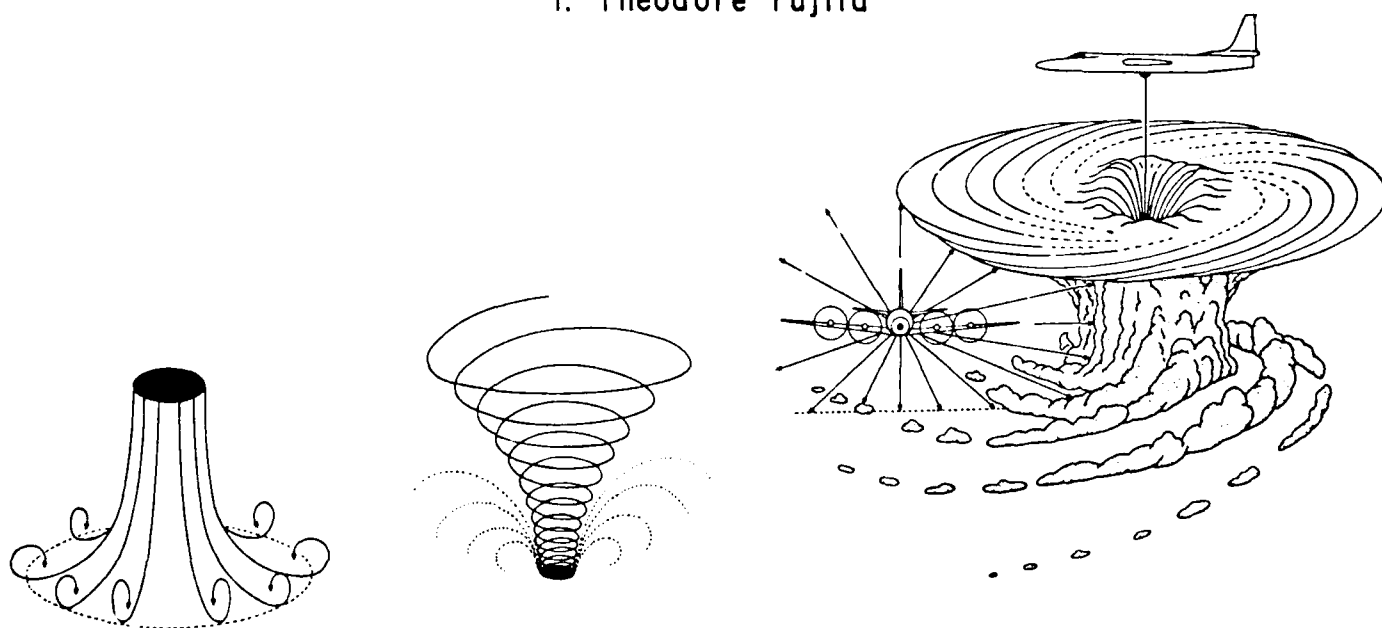


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JUN 83 - MAY 84

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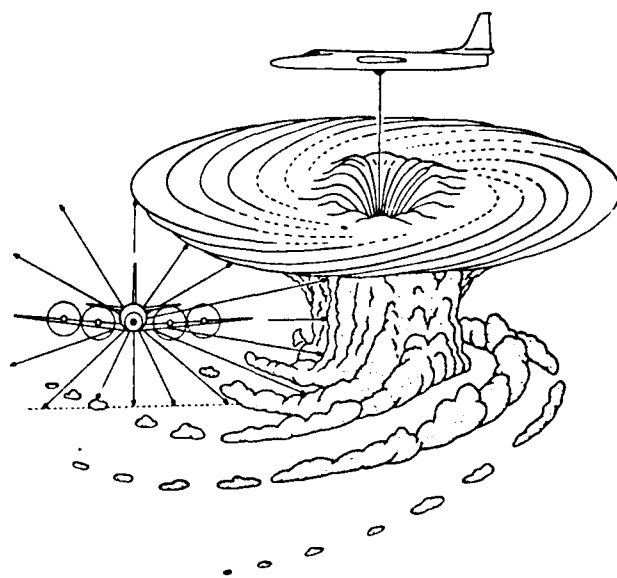
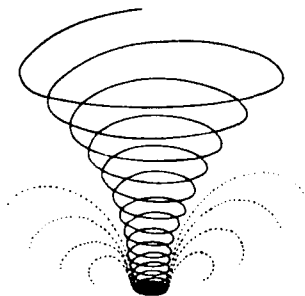
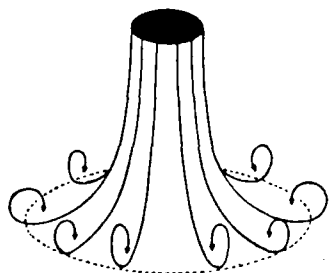
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Northern Hemisphere Cyclones

JUN 84 - MAY 85

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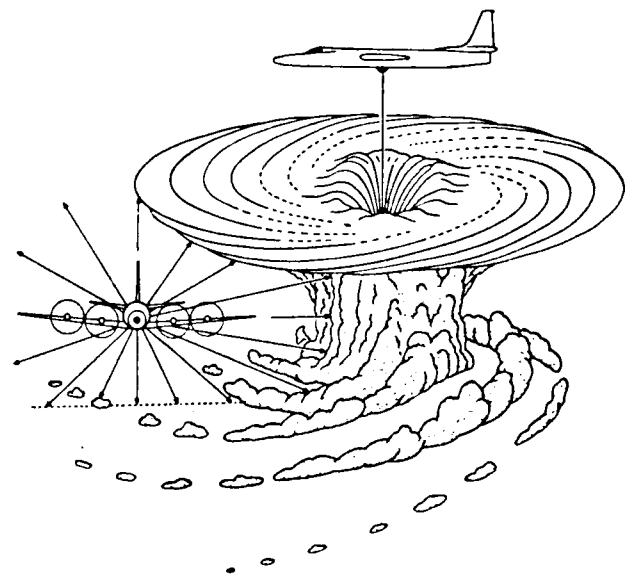
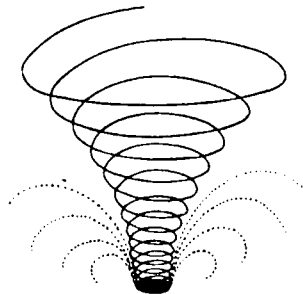
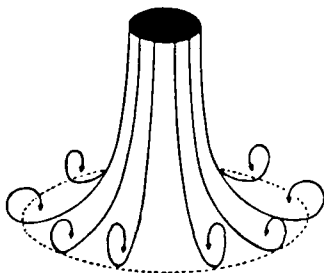
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Northern Hemisphere Cyclones

JUN 85 - MAY 86

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